

# Hardware Implementation of ANFIS Controller for Gas-Particle Separations in Wet Scrubber System

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## Abstract

Wet scrubber system has been used for the control of gas and particulate matter (PM) emissions from production industries. Due to non-linear characteristics, wet scrubbers are limited to the control of PM that is less than  $5\mu\text{m}$ . In this study, an intelligent control technique based on Adaptive Neuro-Fuzzy Inference System (ANFIS) has been designed using MATLAB software. The ANFIS Controller has the advantage of solving non-linearities in the proposed wet scrubber system by manipulating the scrubbing liquid droplet size for the effective control of particulate matter that is less than  $5\mu\text{m}$ . From the simulation results, the controller was able to set PM concentration below the setpoint and provides smooth control response within short settling time. Hardware implementation of the ANFIS controller was performed using prototype wet scrubber system by considering Arduino Duemilanove microcontroller and MATLAB interface. The results show that the intelligent controller has achieved the desired objectives of controlling the PM concentration effectively by setting the value below the set point ( $20\mu\text{g}/\text{m}^3$ ) which is the allowable PM concentration standard recommended by World Health Organization.

**Keywords:** hardware implementation, ANFIS controller, gas-particle separations, wet scrubber system, Liquids, Computers, Abstracts, Hardware, Slurries

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